

Floodplain Mapping and Map Modernization

presented by:

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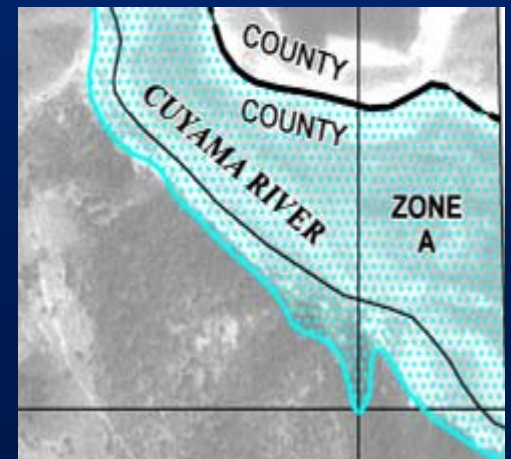
Outline

- ◆ Map Modernization Overview
- ◆ Background on NFIP & DFIRMs
- ◆ Map Modernization
- ◆ Pace of Development in California
- ◆ Mega Regions
- ◆ Mid Course Adjustment
- ◆ Opportunities in Partnerships
- ◆ Map Mod in California
- ◆ Datum Conversion
- ◆ Floodplain Boundary Standard
- ◆ Interim Guidance on Levees
- ◆ Levees in California



Map Modernization

- ◆ Flood Map Modernization (“Map Mod”)
 - Five-year program to update the Nation’s 100,000-panel Flood Insurance Rate Map (FIRM) inventory
 - Effort to update and transform flood maps into more reliable, easy-to-use, and readily available digital products
- ◆ Map Mod enables communities and citizens to
 - efficiently obtain flood hazard data
 - learn their flood risk
 - make informed decisions about development, floodplain management, and mitigation projects that limit damages in future flooding events



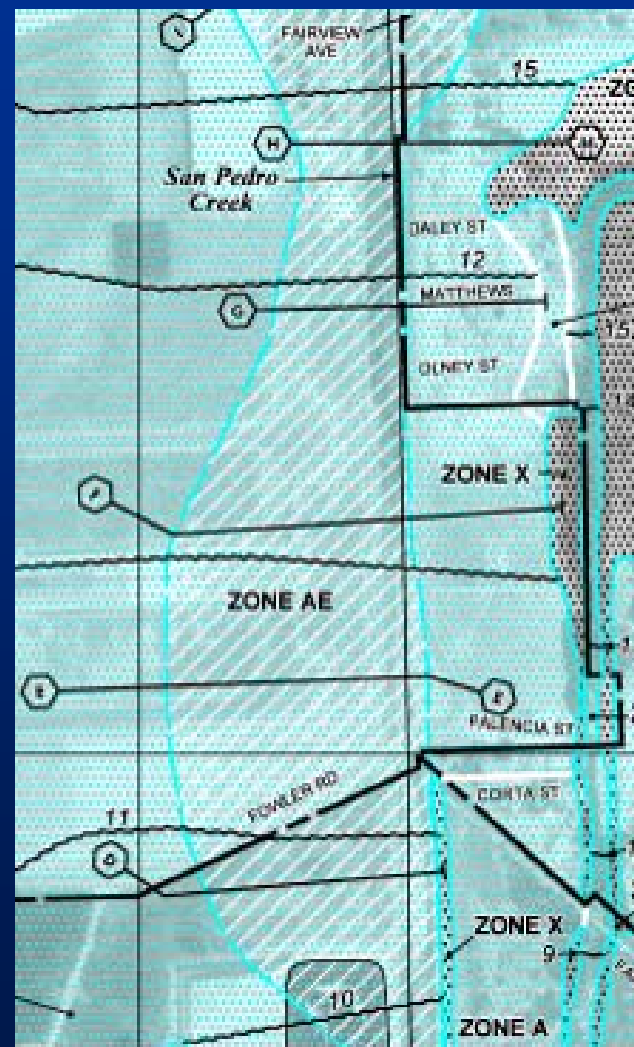
Background - NFIP

- ◆ Purpose of NFIP
 - Flood Insurance for property owners
 - Alternative to outlays in Federal Disasters
 - Floodplain Management and Mitigation Measures
- ◆ Accurate, up-to-date, and distributable DFIRMs are a crucial component of NFIP & Map Mod



Background – DFIRMs

- ◆ Countywide Digital Flood Insurance Rate Maps (DFIRMs)
 - Consolidate separately published FIS reports and FIRMs into one seamless countywide FIS report and FIRM;
 - Incorporate LOMRs, existing data studies, and high-priority restudies
 - Depict flood hazard information on base map complying with FEMA specifications



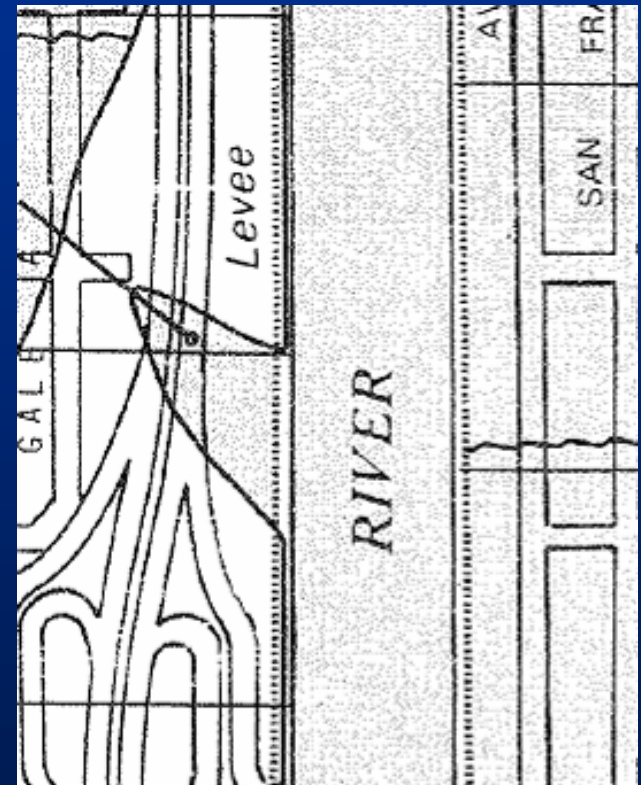
Background – DFIRMs

- ◆ **Countywide Digital Flood Insurance Rate Maps (DFIRMs)**
 - **Upgrade FIRMs to GIS database format**
 - For detailed engineering studies
 - To enable support for GIS analyses and other digital applications
 - **Convert vertical reference datum for flood elevation data from NGVD 29 to NAVD 88**



Background – DFIRMs

- ◆ Countywide Digital Flood Insurance Rate Maps (DFIRMs)
 - Validate currency of certification of accredited levees (PM 34)
 - Upgrade floodplain boundary delineations for non-restudied flooding sources to conform to new base map or topo (PM 38)



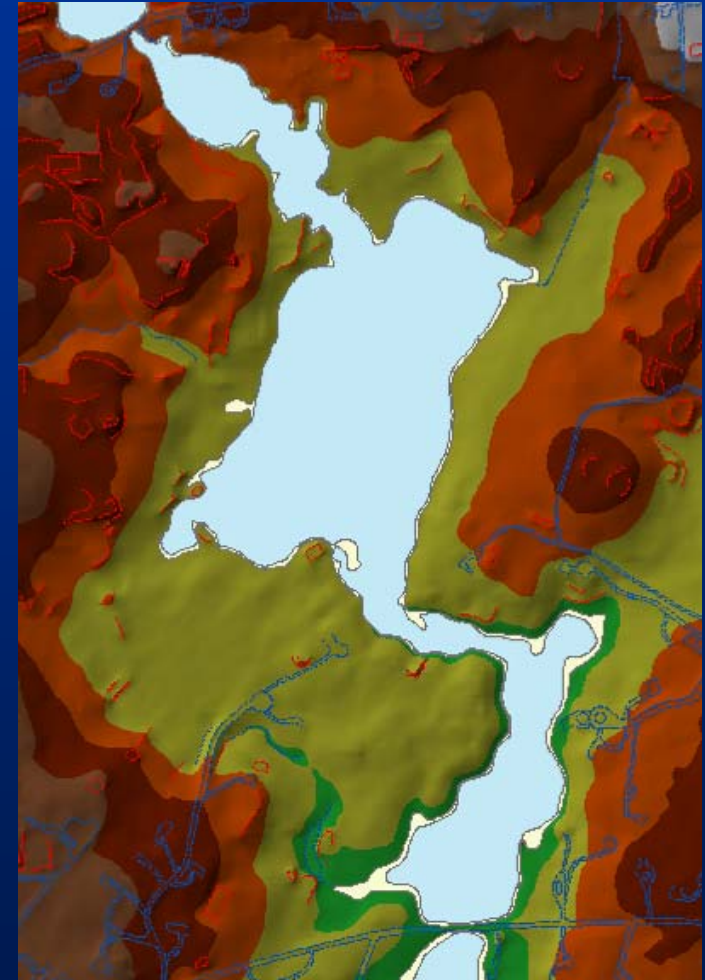
Map Modernization

- ◆ Technology based, cost effective long-term process for updating, maintaining, storing, and distributing the flood risk information
- ◆ Update flood maps to incorporate physical changes since the original mapping
- ◆ Use GIS tools and information



Map Modernization

- ◆ Use GIS tools and information
 - Ease of modification and updating
 - Electronic access and transmission
 - Incorporate more detailed topographic information
 - Lower long term production and maintenance costs
 - Better archival of information
 - Supports robust analysis
 - Use of information across various platforms



Pace of Development in California

◆ Population Growth in California

	1960	1970	1980	1990	2000
Population (millions)	15.72	19.97	23.67	29.76	33.87
Change (millions)		4.25	3.70	6.09	4.11
Percent Change		27.07%	18.51%	25.74%	13.82%

- **Population explosion in Southern CA**
 - 1990-2000: 58% of state's total population growth
 - 2000 to 2004: 67% of state's total population growth
 - 5 of the top 20 fastest growing counties in the nation
- **Growth – Flood Hazards are dynamic!!!!**
 - Changes in watershed = increased flows (i.e. NEW HYDROLOGY)
 - Increase in stream crossings = NEW HYDRAULICS
 - Development in Floodplain = NEW TOPOGRAPHIC MAPPING
 - Need for updated Flood Hazard Mapping (esp. in Zone A areas)



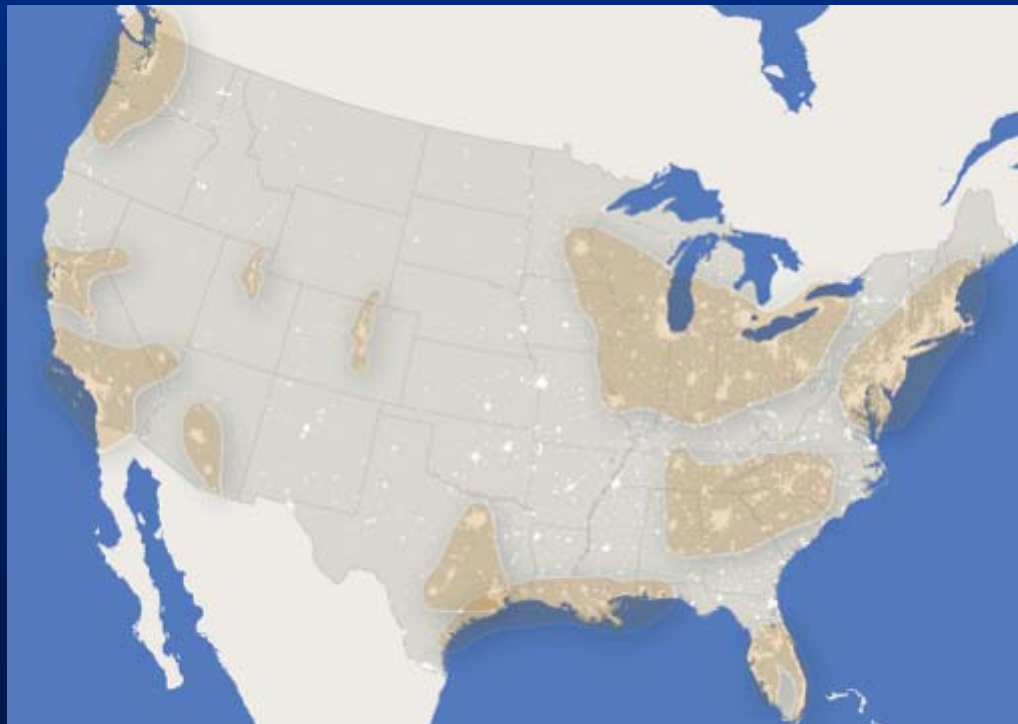
Pace of Development in California

◆ Top 20 Counties by 2000 Population

RANK	REGION	STATE	COUNTY	POP 2000	'90 to '00 % Change
1	9	California	Los Angeles	9,519,338	7%
2	5	Illinois	Cook	5,376,741	
3	2	Puerto Rico	Puerto Rico	3,808,610	
4	6	Texas	Harris	3,400,578	
5	9	Arizona	Maricopa	3,072,149	45%
6	9	California	Orange	2,846,289	18%
7	9	California	San Diego	2,813,833	13%
8	2	New York	Kings	2,465,326	
9	4	Florida	Miami-Dade	2,253,362	
10	2	New York	Queens	2,229,379	
11	6	Texas	Dallas	2,218,899	
12	5	Michigan	Wayne	2,061,162	
13	0	Washington	King	1,737,034	
14	9	California	San Bernardino	1,709,434	21%
15	9	California	Santa Clara	1,682,585	12%
16	4	Florida	Broward	1,623,018	
17	9	California	Riverside	1,545,387	32%
18	2	New York	New York	1,537,195	
19	3	Pennsylvania	Philadelphia	1,517,550	
20	1	Massachusetts	Middlesex	1,465,396	

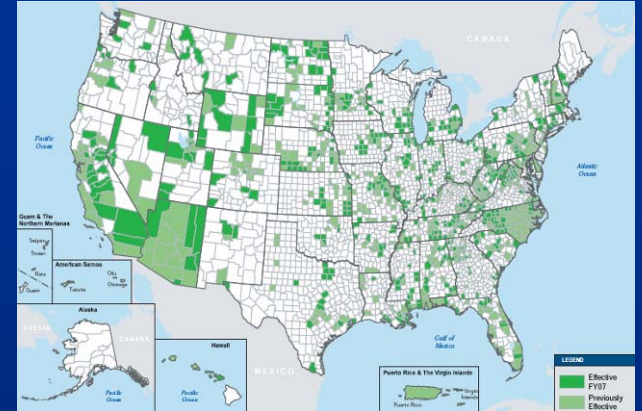
Mega Regions - Population Centers

- ◆ Mega Regions = Urban centers with more than 10 million residents
- ◆ Transition of modern cities from being isolated to being part of “city systems” (i.e. urban networks)
- ◆ California is projected to have 2 such mega regions



Map Mod Mid Course Adjustment

- ◆ Originally, Map Mod focused on creating a digital flood layer for ALL communities at risk of flooding
- ◆ Recommendations from stakeholders to
 - Focus on developing flood maps that meet higher standards of mapping
 - Greater allocation of resources to those communities at greater risk (i.e. delay in new flood maps for lower risk communities)



Map Mod Mid Course Adjustment

- ◆ Mid Course Adjustment:
 - Delay 100% digital overage- 92% of population and 65% of land areas will have digital maps by the end of the 5-year plan
 - 30% of mapped stream and coastal miles and 40% of population will have new, updated, or validated engineering analysis
 - 75% of stream and coastal miles will meet the 2005 Floodplain Boundary Standard (aka "Section 7")
 - Go back and check DFIRMs already done to see if they meet the 2005 Floodplain Boundary Standard and perform "touch ups" where necessary

Map Mod Mid Course Adjustment

◆ Revised objectives

	Original Course	Adjusted Course
% of land area of continental United States covered by digital flood maps	100%	65%
% of U.S. population covered by digital flood maps	100%	92%
% of mapped stream miles meeting 2005 Floodplain Boundary Standard	57%	75%
% of population covered by maps meeting 2005 Floodplain Boundary Standard	32%	80%
% of mapped stream miles with validated, new or updated engineering analysis	22%	30%
% of population covered by maps with validated, new or updated engineering analysis	15%	40%



Opportunities in Partnerships

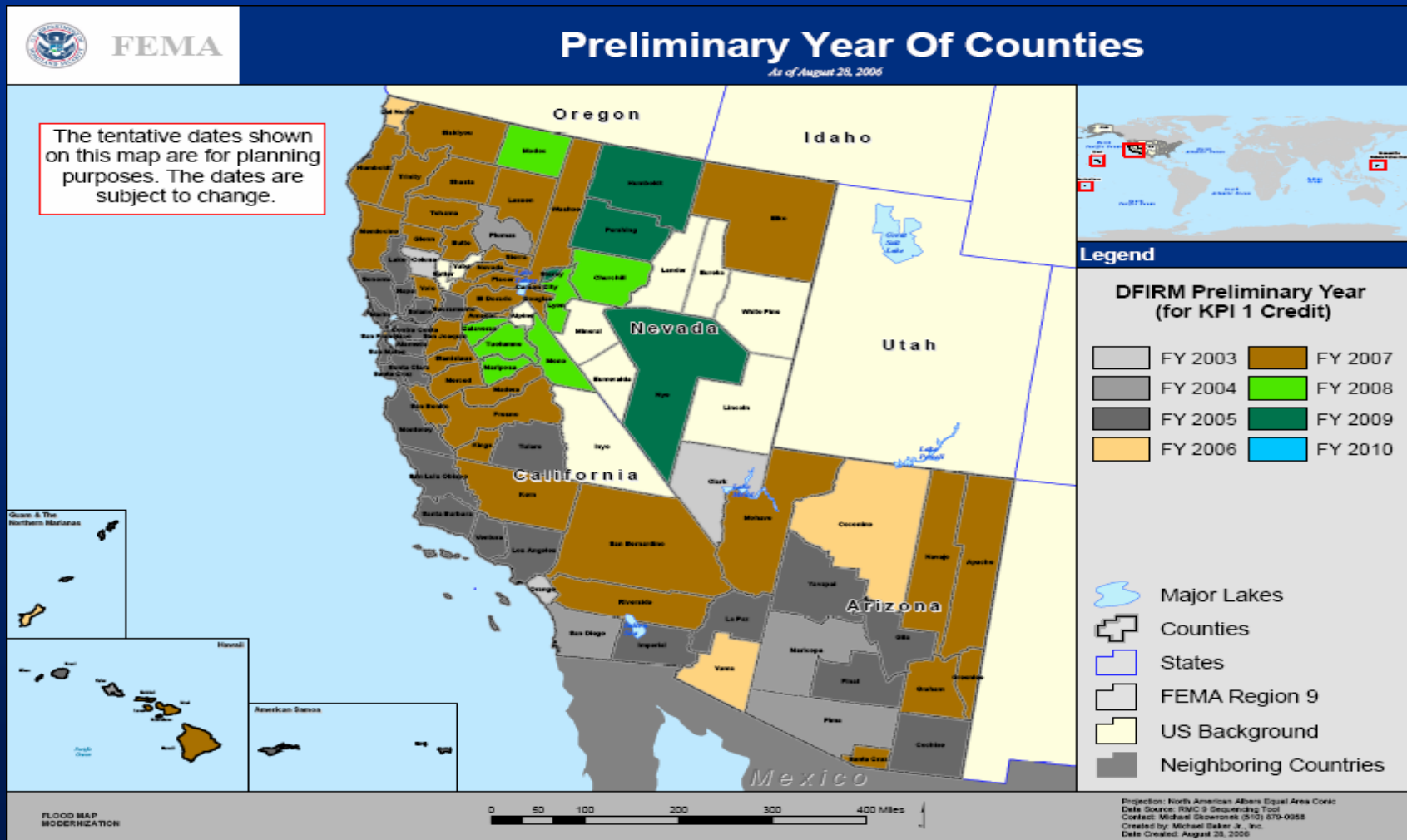
- ◆ Restudy Costs
 - \$15,000 - 20,000 / mile
 - Costs can be a fraction if community partners to provide topography / LiDAR / hydrology
- ◆ Leverage California DWR mapping program funding along with MAP MOD to increase area restudied
- ◆ Cooperating Technical Partner Agreements
 - County & municipal governments
 - Water Management and Flood Control Districts



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Map Mod in FEMA Region IX

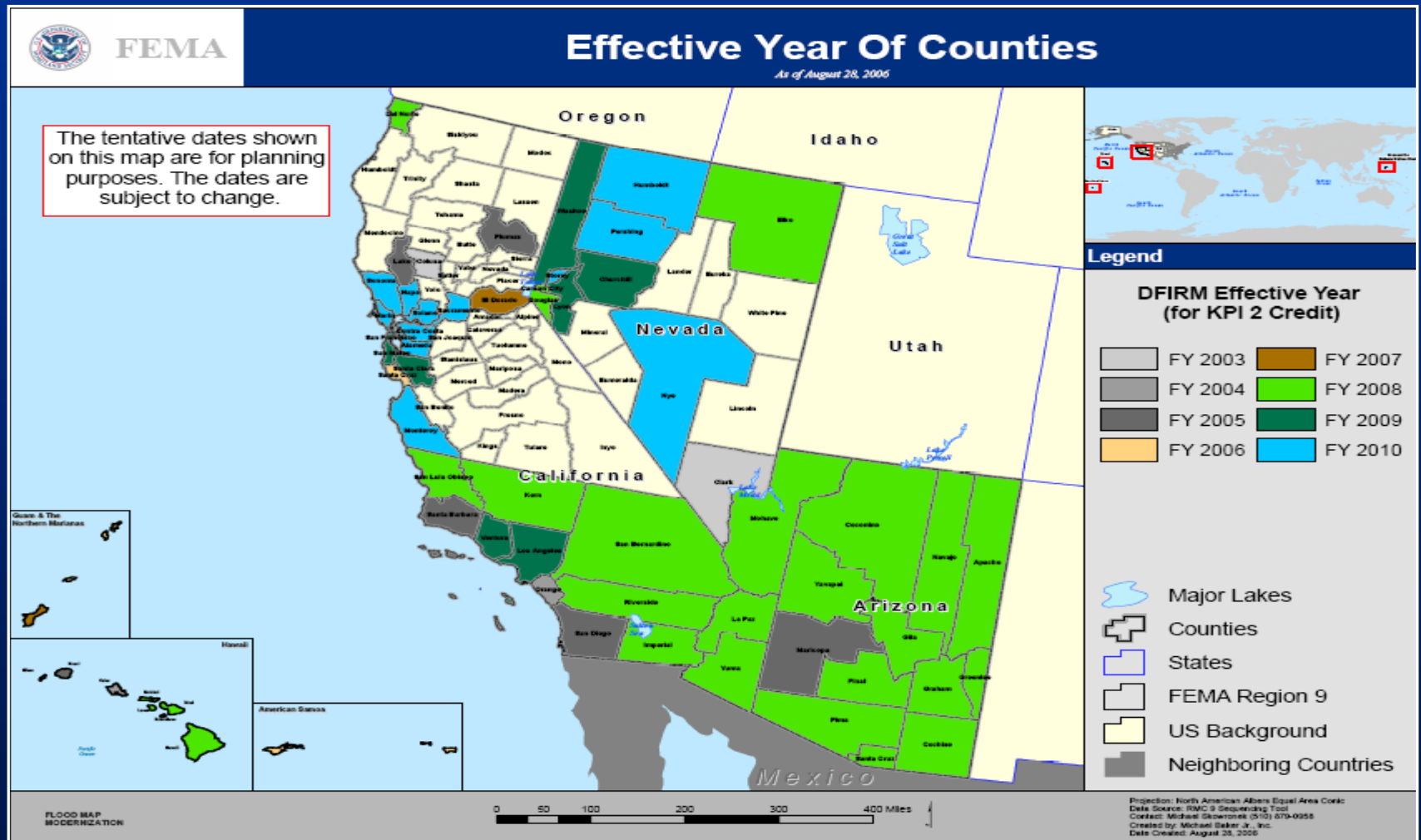
◆ Preliminary DFIRM Projections



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Map Mod in FEMA Region IX

◆ Effective DFIRM Projections

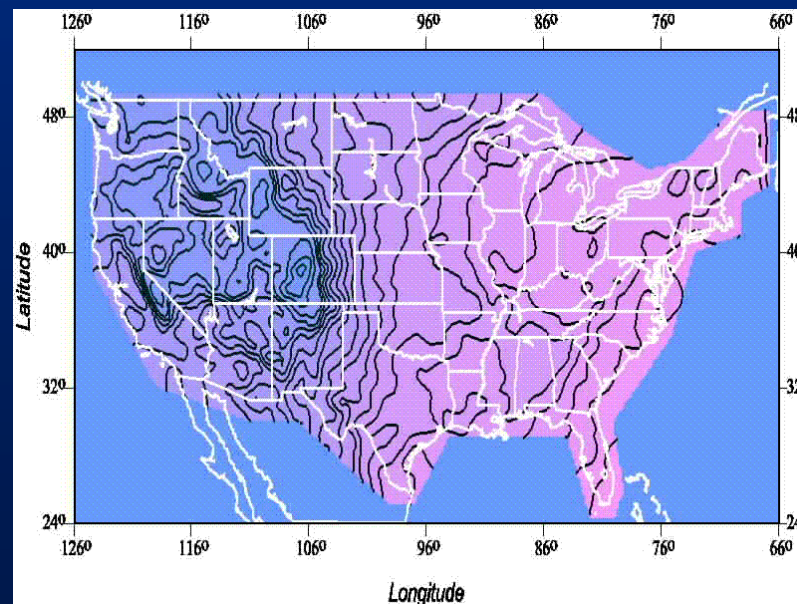


Conversion of FISs & FIRMs to NAVD 88

- ◆ National Geodetic Vertical Datum of 1929
 - Based on observed mean sea level
 - Historically most common vertical datum used by FEMA
 - Obsolete and no longer supported by the National Geodetic Survey (NGS)
- ◆ North American Vertical Datum of 1988
 - Established by adjustment of Canadian-Mexican-U.S. leveling observations
 - Supported by NGS

Conversion of FISs & FIRMs to NAVD 88

- ◆ Difference In Datum Varies, Dependent Upon Location on Earth
- ◆ Since Change Is Relative, No Real “Shift” In Location
 - “Zero reference” has changed for not only flood elevations, but also ground elevations, etc.



Floodplain Boundary Standards

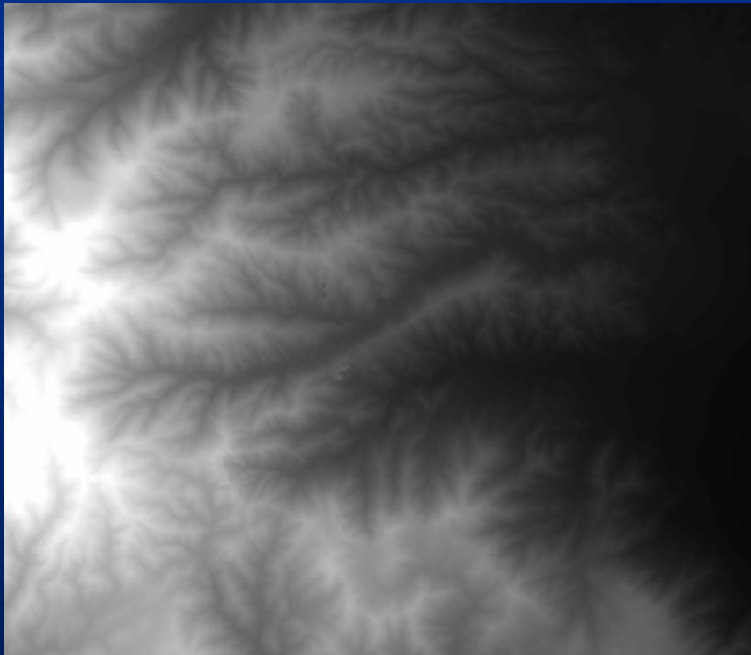
- ◆ Procedural Memorandum 38 – Implementation of Floodplain Boundary Standards (Section 7 of MHIP V1.0)
 - FEMA is committed to delivering high-quality mapping products to its stakeholders using proven and reliable technologies.
 - Section 7 of FEMA's November 2004 *Multi-Year Flood Hazard Implementation Plan* (MHIP) discussed the methods of flood hazard data collection, analysis, and mapping appropriate for varying levels of risk.
 - Section 7 presents a floodplain boundary standard that must be met in order for a map to be considered "modernized."
 - Use of "best available data"



Floodplain Boundary Standards

◆ Challenges

- Availability of good topographic information or study contractor work maps
- Comparing data sources to determine what is “best available data”
 - e.g. 20 year old 4 ft contour data or 2000 USGS DEMs (10 m cell size)



Interim Guidance for Studies Including Levees

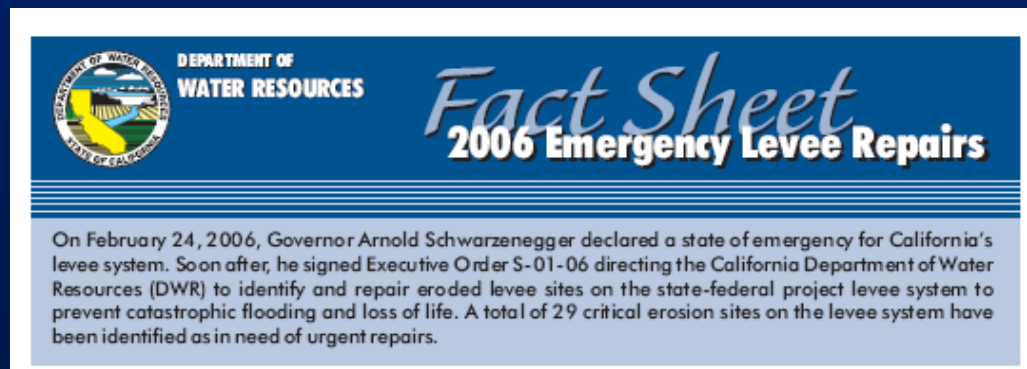
◆ Challenges

- Obtaining archived information on levee certification
- For levees which can be certified
 - Funding for levee certification
 - Timeframe to carry out tasks
- For levees which cannot be certified
 - Obtaining funding for “without levee” analysis and mapping
 - Cost effectively obtaining data for “without levee” mapping



Levees in California

- ◆ Over 6,200 miles of levees in California
- ◆ California State of Emergency in 2006
 - Declared by Gov. Schwarzenegger for state's levee system on Feb 24, 2006.
 - DWR directed by Executive Order S-01-06 to identify and repair eroded levee sites to prevent "catastrophic flooding and loss of life".
- ◆ CA DWR Levee Repair website
 - <http://www.levees.water.ca.gov/>
 - Fact sheet



To Sum Up

- ◆ Map Mod: FEMA's multi-year effort to update and transform flood maps into more reliable, easy-to-use, and readily available digital products
- ◆ Update & improve standard of flood maps
- ◆ Pace of development necessitates the need for up-to-date and accurate flood maps
- ◆ Mid course adjustment of Map Mod to
 - Focus on developing flood maps that meet higher standards of mapping
 - Greater allocation of resources to those communities at greater risk



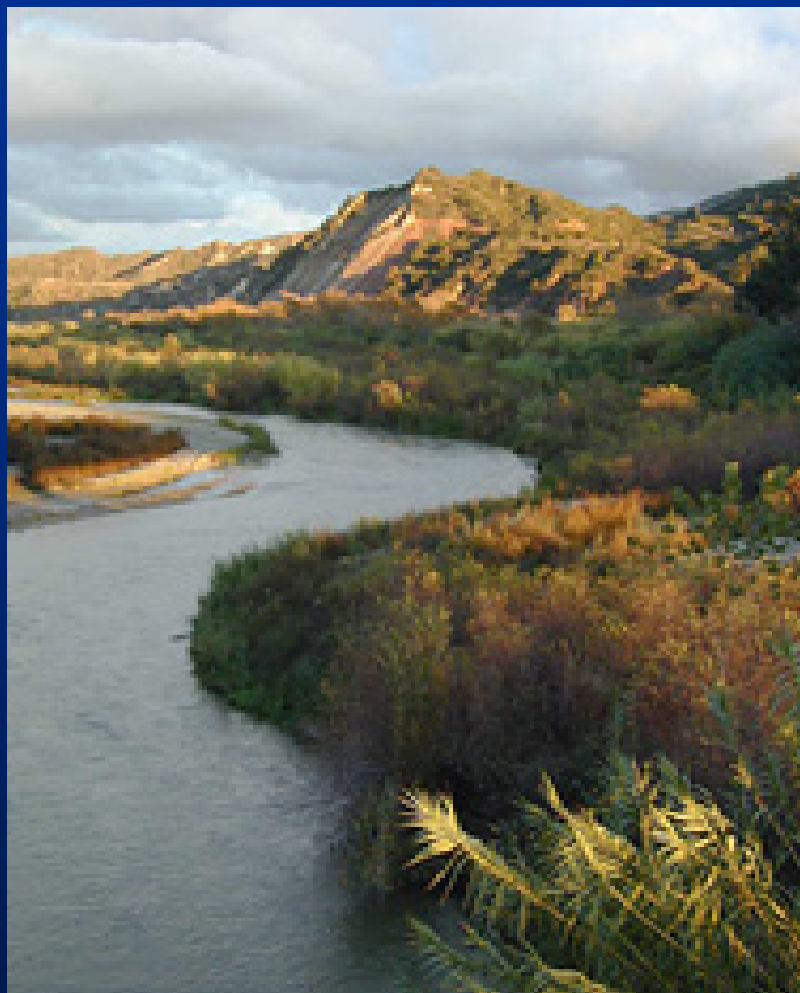
Floodplain Mapping and map Modernization

QUESTIONS?



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Thank you



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